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Patent

IN THE CLAIMS:

This listing of claims replaces all prior versions and listings of claims in the application:

1-12. (canceled)

13. (previously amended) A method for synchronizing a local replicated database with one or more remote replicated databases, comprising:

sending recent local changes made on the local database to a remote database;
receiving changes made on the remote database from the remote database; and
reconstructing the received changes received from the remote database on the local database,

wherein any of the sending, receiving, and reconstructing steps may be performed independently from each other,

wherein the local and remote databases are version-managed databases, each having a plurality of versions, and wherein one version in the local database is nominated as an interface version, and wherein the reconstructing step is performed using the interface version,

wherein changes sent between the local and remote databases are sent in change files, and wherein the reconstructing step comprises:

- (a) creating a child version from the interface version;
- (b) setting the child version to a state identical to a state at the remote database before a received change file comprising the received changes were made at the remote database;
- (c) loading the changes in the received change file into the child version;

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(d) determining whether there has been more than one change file sent by the local database since a most-recent change file sent by the local database and received and processed by the remote database before the remote database sent the received change file;

(e) if there has been more than one change sent by the local database, reconciling the interface version with any intervening states of the local database following the state identified by the change file received from the remote database and preceding the interface version;

(f) reconciling the interface version with the child version; and

(g) posting the state comprising the results of reconciling the child version with the interface version to the interface version.

14. (original) The method of claim 13, wherein the step of reconciling the interface version with any intervening states comprises:

(i) creating a grandchild version from the interface version;

(ii) setting the grandchild version to a state represented in a change file sent by the local database sequentially after the most-recent change file, and henceforth taking a "current" change file to be that sequential change file;

(iii) reconciling the grandchild version with the child version;

(iv) posting the state comprising results of reconciling the grandchild version with the child version to the child version; and

(v) if another change file was sent from the local database after the "current" change file in the state to which the grandchild version in step (f) was pointing but before the state to which

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the interface version is pointing, then repeating steps (ii) through (v) using each change file sent by the local database following sequentially after the most-recent change file.

15. (original) The method of claim 14, wherein the states are implicit.
16. (original) The method of claim 14, wherein the states are explicit.
17. (original) The method of claim 14, wherein the step of reconciling the grandchild version with the child version, comprises:
 - merging differences between the grandchild and child versions; and
 - resolving any conflicts between the grandchild and child versions according to a set of preset rules.
18. (original) The method of claim 17, wherein the step of reconciling the grandchild version with the child version, further comprises:
 - creating a first park version and a second park version; and
 - setting the grandchild version in the first park version and setting the child version in the second park version if data in the grandchild version conflicts with data in the child version.
19. (original) The method of claim 14, wherein the step of reconciling the interface version with the child version, comprises:

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merging differences between the interface and child versions; and
resolving any conflicts between the interface and child versions according to a set of
preset rules.

20. (original) The method of claim 19, wherein the step of reconciling the
interface version with the child version, further comprises:
creating a first park version and a second park version; and
setting the interface version in the first park version and setting the child version in the
second park version if data in the interface version conflicts with data in the child version.

21-27. (canceled)

28. (previously amended) A method for synchronizing a local replicated database
with a remote replicated database, comprising the steps of:
autonomously and asynchronously sending changes made on the local database to the
remote database, independent of any steps of receiving and reconstructing changes;
autonomously and asynchronously receiving changes made on the remote database to the
local database, independent of any steps of sending and reconstructing changes; and
autonomously and asynchronously reconstructing received changes made on the remote
database on the local database, independent of any steps of sending and receiving changes,

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wherein each of the local and remote databases is a version-managed database comprising a plurality of versions, and wherein a version in each of the local and remote databases is nominated as a local interface version and a remote interface version, respectively,

wherein changes sent between the local and remote databases are sent in change files,

wherein each change file sent by the local database comprises a local sequence number identifying a state of the local database at the time the change file is sent and a remote sequence number identifying a state of the remote database known by the local database, and wherein each change file sent by the remote database comprises a remote sequence number identifying a state of the remote database at the time the change file is sent and a local sequence number identifying a state of the local database known by the remote database at the time the change file is sent, and

wherein the reconstructing step comprises:

(a) creating a child version of the local database set to a state associated with a local sequence number in a received change file received from the remote database;

(b) loading the received change file into the child version;

(c) determining whether a difference between a sequence number associated with the local interface version and the local sequence number of the change file is more than one;

(d) if the difference is more than one, reconciling intervening versions of the local database, comprising:

(i) creating a grandchild version of the local database set to a state associated with a sequence number immediately following the local sequence number of the received change file;

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- (ii) reconciling the child version with the grandchild version;
- (iii) posting reconciliation results of reconciling the child version with the grandchild version to the child version;
- (iv) if a difference between the local sequence number of the local interface version and the sequence number of the child version is more than one, then repeating steps (i) to (iv) using a state of the local database associated with a sequence number next following the local sequence number of the received change file;
- (e) reconciling the interface version with the child version; and
- (f) posting a state comprising reconciliation results of reconciling the interface version with the child version to the interface version.

29. (original) The method of claim 28, wherein the step of reconciling the interface version with the child, comprises the steps of:
merging differences between the interface and child versions; and
resolving any conflicts between the interface and child versions according to a preset rules.

30. (original) The method of claim 29, wherein the step of reconciling the interface version with the child version, further comprises the step of:
creating a first park version and a second park version; and

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setting the interface version in the first park version and setting the child version in the second park version if data in the interface version conflicts with data in the child version.